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# DEPARTMENTS.

## SOLUTIONS OF PROBLEMS.

### ARITHMETIC.

122. Proposed by G. B. M. ZERR, A.M., Ph.D., Professor of Mathematics and Science, Chester High School, Chester, Pa.

Suppose 10% traction stock is 20% better in the market than 5% mining stock; if my income be \$500 from each, how much money have I paid for each, the whole investment bringing $6\frac{2}{3}\%$?

Solution by BENJAMIN F. YANNEY, A. M., Professor of Mathematics, Mount Union College, Alliance, Ohio; M. A. GRABER, Student in Heidelberg University, Tiffin, Ohio; E. L. SHERWOOD, Professor of Mathematics, Beaver College, Beaver, Pa.; and the PROPOSER.

$\$500 \div .10 = \$5000 =$ par value of traction stock;

$\$500 \div .05 = \$10000 =$ par value of mining stock;

$\$1000 \div .06\frac{2}{3} = \$15000 =$ whole investment.

$\$5000 = \frac{1}{2}$ of \$10000 or the face of the traction stock is one-half the face of the mining stock $= 50\%$.

$\therefore 100\% = 50\%$ or $1\% = \frac{1}{2}\%$.

$20\% = 20 \times \frac{1}{2}\% = 10\% =$ excess of traction stock over same amount of mining stock.

$50\% + 10\% = 60\% =$ investment in traction stock.

$100\% + 60\% = 160\% =$ whole investment.

$\$15000 \div 1.60 = \$9375 =$ amount invested in mining stock.

$\$15000 - \$9375 = \$5625 =$ amount invested in traction stock.

Also solved, with different results, by *ELMER SCHUYLER*, *ALOIS F. KOVARIK*, *COOPER D. SCHMITT*, and *LESLIE L. LOCKE*.

123. Proposed by F. P. MATZ, M. Sc., Ph. D., Professor of Mathematics and Astronomy, Irving College, Mechanicsburg, Pa.

If $m=2$ cents be the interest on $M=100$ cents for $p=40$ days, find the yearly rate per cent.

Solution by COOPER D. SCHMITT, A. M., Professor of Mathematics, University of Tennessee, Knoxville, Tenn.; ALOIS F. KOVARIK, Instructor in Mathematics and Science, Decorah Institute, Decorah, Iowa; LESLIE L. LOCKE, Professor of Mathematics, Fredonia Institute, Fredonia, Pa.; ELMER SCHUYLER, Professor of German, Reading, Pa.; and G. B. M. ZERR, A. M., Ph. D., Professor of Mathematics and Science, Chester High School, Chester, Pa.

If the interest on $M$ cents for $p$ days is $m$ cents, the interest on $M$ cents for 1 day is $m/p$ cents, and for one year is $360m/p$ cents. Then the annual rate is $\frac{360m/p}{M}$ of 100% which equals $\frac{36000m}{pM}$. In the present example $m=2$, $p=40$, $M=100$. Whence rate $= \frac{72000}{4000} = 18\%$.